Automatic Door Locking System

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Abstract - **Our main objective is to utilize the different electronic parts available in the market and build an integrated home security system by using Bluetooth device and Microcontroller technology. This system gives service at low cost compared to the cost of the available security system. We want to make a system that will give 24 into 7 service By using registered password in this system we can unlock the door by which it increases the security level to prevent an unauthorized unlocking. If the user forgets the combination of password this system gives the flexibility to the user to change or reset the password. Security measure is very high as provided in two ways. First we have to enter password for blue-tooth connection and second is for unlocking the door in application. Both passwords can be changed as and when required. This automatic password based lock system will give user more secure and low cost way of locking-unlocking system.**

Index Terms -**Microcontroller, Stepper motor, Bluetooth device, Password.**

I. INTRODUCTION

Various control systems have been designed over the years to prevent access to unauthorized user. The main aim for providing locks for our home, school, office, and building is for security of our lives and property. It is therefore important to have convenient way of achieving this goal.

Automatic door system have become a standard feature on many different types of buildings and homes. And they are becoming popular every day to develop an effective electronic devices which provide security. Home security has been a major issue because of the increase in crime rate and everybody wants to take proper action to prevent unauthorized user. There was a necessity to automate home so that user can take advantage of the GSM technology and computer control system. The devices like a telephone land line or the Global System of Mobile communication (GSM) can provide features which can be used domestically to handle appliances like; door, television, robotic arm, refrigerator, air condition, electric bulb, etc.

Literature Survey

Literature survey is carried out to gain information and knowledge. Before starting with the analysis and design of project, we referred many research papers, manuals, documents related to the concept of project.

DOOR-AUTOMATION SYSTEM USING BLUETOOTH BASED ANDROID FOR MOBILE PHONE By, Lia Kamelia, Alfin Noorhassan S.R, Mada Sanjaya and W.S., Edi Mulyana

This paper gives overall idea of how to control home security for smart homes especially for door key locks. We use android door lock system for indoor and outdoor key lock system. It also provides a security for Android phone users. This project based on Android platform which is Free Open Source. So the implementation rate is inexpensive and it is reasonable by a common person. With the wireless Bluetooth connection in microcontroller permits the system installation in more easy way. The system has been designed successfully. And aimed to control the door condition using an Android phone which is Bluetooth-enabled via Bluetooth HC-05.We have discussed a simple prototype in this paper but in future it can be extended to many other regions [1].

AUTOMATIC PASSWORD BASED DOOR LOCK SYSTEM By, Shilpi Banerjee

In this paper detail information about system has been given in which we can unlock the door by using pre-decided password. It increases the security level to prevent an unauthorized unlocking done by attacker. In case the user forgets the both passwords, this system gives the flexibility to the user to change or reset the password. This automatic password based lock system will give user more secure way of locking-unlocking system. First the user combination will be compared with prerecorded password which are stored in the system memory. User can go for certain number of wrong combinations before the system will be temporarily disabled. The door will be unlocked if user combination matches with the password. The same password can be used to lock the door as well. This system will give the user an opportunity to reset his own password if he wants [2].

PASSWORD BASED SECURITY LOCK SYSTEM By, Arpita Mishra, Siddharth Sharma, SachinDubey, S.K.Dubey

In day to day life security of any object or place password based system plays a major role. This project has considered about this and created a secure access for a door which needs a password to unlock the door. Using keypad it enters a password to the system and if entered password is correct then door is open by motor which is used to rotate the handle of the door lock. When it is entered incorrectly at the first time it will give three attempts to enter the password. Some extra features like adding new users and changing old password are configured by the keypad as usual. To display messages to the user LCD module is used. Now a days most of the systems are automated in order to face new challenges to achieve good results. These systems have less manual

operations, so the flexibility, reliabilities are high and accurate are there characteristics. Hence every field prefers automated control systems especially in the field of electronics [3].

II. METHODOLOGY

The basic idea behind the working of door lock lies in the interpretation of the data or ASCII characters sent by the Android phone by means of the developed app. To interpret the data sent by the phone, firstly a Bluetooth module (HC-05) which is configured by default at a baud rate of 9600 is connected to the Microcontroller which is also configured at the same baud rate. The data which is been received by the HC-05 is then given to the Microcontroller (ATmega16), which understands in ASCII format, now depending upon the received set of character operations are performed whether to unlock the door or to lock it. The app is well protected by means of a password thus neglecting any fraud access to the door and is been avoided to be provoked by anonymous user. This is highly useful when we are trying to automate the home. Although our Application also provides a better amount of security for the user, by means of accessing via a password.

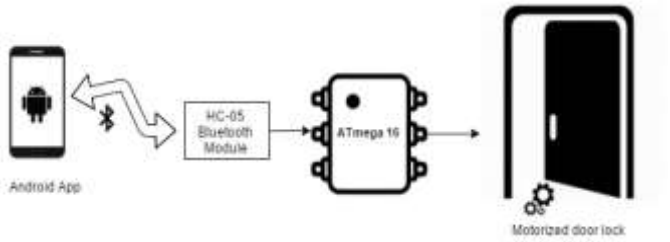


Fig. 1 Block diagram of Door locking System

The block diagram in Figure-1 describes the system overall. This system has input from android Smartphone, the overall system is controlled automatically and the output is a stepper motor movement that connected to the microcontroller. The function of each block can be seen in Table-1.

Table 1 The function of each system block

No	System Block	Function
1	Microcontroller	As data processing center
2	Android phone	As data input
3	Bluetooth Module HC-05	As data receiver
4	Battery (5V)	As power supply
5	LED	As indicator

Hardware Details

1. Atmega16 Microcontroller

Fig. 2 ATmega16 Microcontroller

A microcontroller serves as the brain of a mechatronic system. Like a mini self-contained computer, it can be programmed to communicate with both the hardware of the system and the user of that system. Even the most basic microcontroller can perform simple math operations monitor digital inputs, control digital outputs and gives efficient output. As the computer industry has evolved technology has also associated with microcontrollers.

Newer microcontrollers are much faster, have more memory and have a host of input and output features that has the ability of earlier models. Most modern controllers have analog-to-digital converters, high-speed timers and counters, interrupt capabilities, serial communication ports [6].

2. Stepper motor

Fig. 3 Stepper Motor

Stepper motor is an electromechanical device whose function is to convert electrical power into mechanical power. Also it is a synchronous electric motor that can divide a full rotation into an expansive number of steps. The motor's position can be controlled accurately and efficiently without any feedback mechanism, as long as the motor is carefully sized to the specific application. Stepper motors are similar to earlier motors but has additional capabilities. The stepper motor makes the motor to take shaft turn an accurate distance when a pulse of electricity is provided. The stator has eight poles while the rotor has six poles. The rotor requires 24 pulses of electricity to move the 24 steps to make one complete revolution [5].

3. Bluetooth device HC-05

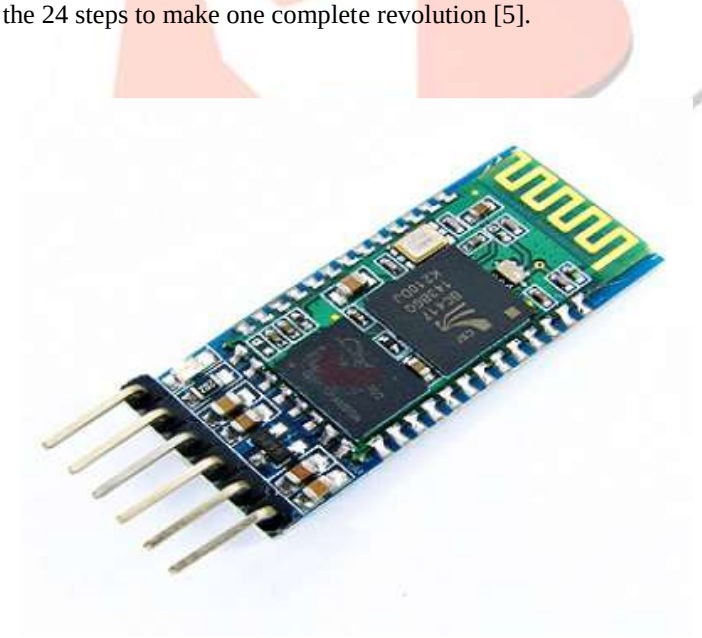


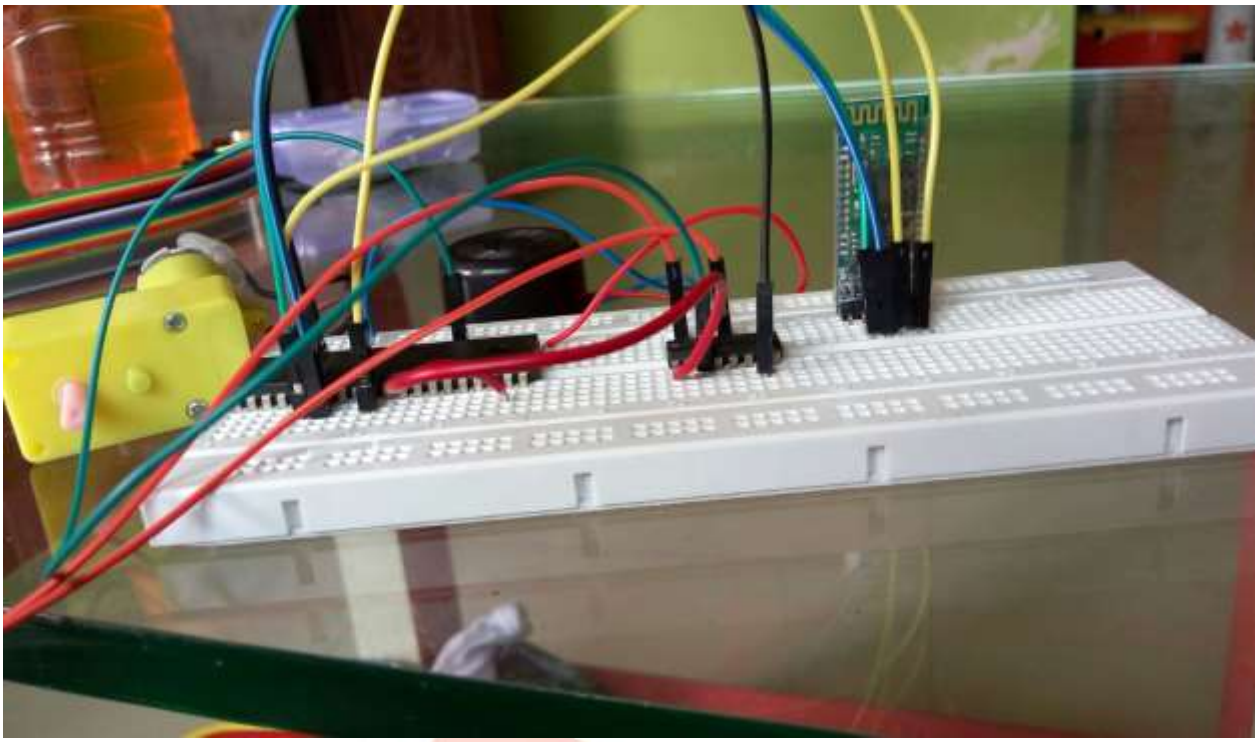
Fig. 4 Bluetooth device (HC-05)

The HC-05 Bluetooth Module has 6 pins named as Vcc, GND, TX, RX, Key, and LED. It is pre-programmed as a slave, so there is no need to connect the Key pin. If you want to make it as a MASTER then you have to check its pin configuration. There is major difference between Master and Slave modes. In Slave mode the Bluetooth module cannot have a connection. It can only accept incoming connections. After the connection is established the Bluetooth module can transmit and receive data according to the mode it is running in. You can simply use it in the Slave mode if you are using a phone to connect to the Bluetooth module. The default data transmission rate is 9600kbps (kilo bytes per second).The range for Bluetooth communication is usually 30m or less than 30m [7].

Software Details

For developing an Android app we have used Android SDK in which Android is a mobile operating system (OS) based on the Linux kernel and recently developed by Google. Android has user interface based on direct manipulation which is used for touchscreen mobile devices such as smartphones and tablet computers to make processing fast.[4].

III. IMPLEMENTATION



IV. CONCLUSION

This is ongoing project. This paper gives basic idea of how to control home security for smart home, especially for door key locks. It also provides a security and easy for Android phone users. This project based on Android platform which is Free Open Source Software. So the implementation rate is inexpensive and it is reasonable by a common person. With the wireless Bluetooth connection in microcontroller permits the system installation in more easy way. The system has been successfully designed and aimed to control the door condition using an Android Bluetooth-enabled phone and Bluetooth modules via Bluetooth HC-05. Till now we have successfully implemented hardware and one small application has been invented using MIT app inventor. Future scope of our project is very high. In this semester we will develop the android app using eclipse. We have discussed a simple prototype in this paper but in future it can be extended to many other regions.

V. ACKNOWLEDGMENT

We would like to take pleasure in thanking Finolex Academy of Management & technology for giving this opportunity to develop this project. With great pleasure, we wish to thank to Miss. Priyanka S. Bandagale (project guide) for her valuable guidance and cooperation as and when needed. We would also like to express our gratitude to Prof. S.V. Jadhav (HOD-IT Department, FAMT) for his valuable cooperation.

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